

## Introduction

The ShockLog® 248 is the intermediate model in the ShockWatch® series of impact recorders, which includes the ShockLog® 208 and ShockLog® 298 impact recorders. Available in 10G, 30G, and 100G impact scale range, the ShockLog® 248 monitors impact and internal temperature, provides peak value (time slot) and summary period journey profile data. The ShockLog® 248 will record the detailed impact curve of up to 15 events (the first and 14 most severe). Up to 128 event notifications are maintained in the event summary log. You can set alarm conditions on any of the selected criteria.

FEATURES
Records impact events; max peaks X, Y, and Z and internal temperature
Field-proven tri-axial piezoelectric accelerometer technology
User-definable alarm levels
LED lights for visual notification of alarms and warnings

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## ShockLog<sup>®</sup> 248 Key Features

The ShockLog<sup>®</sup> 248 has been designed to monitor shock based on acceleration measurements. It has several unique features, which make it especially suitable for applications where the cost of exposure to out-of-specification environmental influences is very high. The instrument is equally suitable for protecting high-value fixed or mobile installations and investigating shock during transportation.

The ShockLog<sup>®</sup> 248 has a choice of 3 factory-defined ranges:

Acceleration in G      10G / 40Hz, 30G / 90Hz or 100G / 250 Hz

If any of the accelerometer signals exceeds the 'wake-up' threshold, the processor will turn on and will check the sensor outputs at a much faster rate (2048 samples per second per axis). If the output of any sensor exceeds the alarm threshold, the ShockLog<sup>®</sup> 248 will flash its status LED accordingly. In addition, the detailed time history of the first event to set an alarm and subsequent severe events up to the installed memory capacity will be recorded. The ShockLog<sup>®</sup> 248 has the capability of recording the 1<sup>st</sup> followed by the 14 most severe events as detailed curves in addition to up to 128 notifications of events within the Event summary log.

The ShockLog<sup>®</sup> 248 also supports peak recording in fixed time slots. In this mode, the highest and lowest signal level present on each input is recorded for each time slot. The time slot length may be set between 10 seconds and 1 hour, and as many as 51840 slots (peak x, y, z and temperature) may be recorded. The slots may also include data from optional sensors.

User-Selectable Time Slot Data:

- Max Peaks X,Y,Z      3 bytes
- Internal Temperature      2 bytes
- Options
  - Humidity      2 bytes
  - External Temperature      2 bytes

A feature of the ShockLog<sup>®</sup> 248 is the ability to set alarm conditions on any of the selected slot data; most parameters have a high and low alarm setting point.

In addition to events and time slots, the device checks the output of the sensors (the three built-in accelerometers, the built-in temperature sensor and any external sensors) once every 10 seconds. The information from the sensors is merged into a summary record for each recording period and recorded in nonvolatile memory. The length of the summary period can be set between 10 minutes and 24 hours and there is sufficient memory for 512 periods.

## ShockLog® 248 Specifications

<b>Complete Instrument</b>	
Operating Temperature Range	-40 to 85°C / -40 to 185°F
Drop Test Survival	1m / 39.4 in
Dimensions (over connectors & humidity chimney)	84 x 84 x 55mm / 3.3 x 3.3 x 2.2in
Weight (without Battery)	445g / 1.0lbs
Battery	2 x 3.6V Lithium Thionyl Chloride 2 x 1.5V Alkaline Size AA
Battery Life	Up to 12 months w/ Lithium battery
Case Material	Aluminum
Sealing	IP67
Accelerometers	Piezo
Software	Functions on Windows XP, Vista, 7, 8
Communications / Interfaces	
USB 2 Compliant 12Mbps – effective baud rate	256k
RS232 levels, Rx and Tx Baud rates	19200 (Rx) 57600 (Tx)
iButton	
Indicators	LEDs - 2 Bi-color and 1 Red
A-D Converter Resolution	12 bits
Flash Memory for Data	1024kbytes
<b>EMC</b>	
ETSI EN 301 489-17 v1.3.2 (2008-04)	
ETSI EN 301 489-1 v1.8.1 (2008-04)	
EN61326-2-1:2006	
EN301489-17-V2.1.1	
FCC RULES CFR47: PARTS 15.107 & 15.109	
RTCA DO-160F-Section Radiated Emissions Category B	
<b>Data Collection</b>	
Timeslot Interval	10 to 3600 seconds
Samples per Channel per Event	2048
Maximum Number of Events (detailed)	15
Event Duration	4 to 32 seconds
Number of Timeslots (depends on slot contents)	23563 to 259200
Maximum Number of Summaries	512

<b>Accelerometers</b>	
Low Frequency Cutoff (-3dB 10g – 100g)	0.1 - 0.5Hz
High Frequency Cutoff (-3dB)	250 – 300Hz
Resolution (% of full scale) 1% for Peaks	0.1%
Scale Factor Accuracy at 5G (event record)	±5%
Additional Error Peak Capture	±5%
Acceleration Ranges	±10G, ±30G, and ±100G
Wakeup Threshold (% of range)	5 to 95%
Warning and Alarm Thresholds (% of range)	5 to 95%

## Factory Fit Specifications

<b>Humidity / Temperature Specifications</b>	
Temperature Measuring Range	-40 to 85°C / -40 to 185°F
Temperature Accuracy	±2°C / ±4°F
Temperature Resolution	0.1°
Humidity Measuring Range	0 - 100% RH
Humidity Accuracy	±3% RH
Humidity Resolution	0.1% RH
Dew Point Measuring Range	-40°C to 85°C / -40°F to 185°F
	0 - 100% RH
Dew Point Relative Accuracy (-20 to 70°C, 25 to 75% RH)	±2°C / ±4°F
Dew Point Resolution	0.1°

### Product Construction

The ShockLog® 248 has been designed to function reliably in difficult environments. The electronic components are assembled using surface mount technology and the latest automatic assembly equipment. The complete electronic package is coated with acrylic resin and enclosed in the metal case. The securing bolts pass through the body of the instrument to guarantee a reliable mechanical installation.

This construction technique, in combination with the absence of cables for power or sensors results in a very high immunity to electrical interference and very low levels of RF emission. The ShockLog® 248 may safely be used in close proximity to sensitive instruments or in difficult electromagnetic environments.

The ShockLog® 248 has been designed to meet IP67 (including connectors) and is capable of operating at temperatures between -40 and 85°C.

### How to Use the ShockLog® 248

Control your ShockLog® device through a simple Windows®-based software program. The software allows for configuration of the ShockLog® 248, data extraction, and analysis. Once configured, mount the ShockLog® 248 to the equipment to be monitored. When the journey is complete, remove the ShockLog® and download the recorded information. The ShockLog® Report View provides users with an overview of the entire journey. ShockLog® 248 provides peak acceleration values for all three axes reported on a time basis as well a detailed impact curve. Additional environmental conditions can be monitored and displayed, if desired. (See Accessories and Related Products below for more information.) Users are able to zoom in for a closer view, or export data into programs such as Excel and MatLab for more detailed analysis. Please refer to the manual for full details.

### Communications

The ShockLog® 248 has several mediums of communication. The primary method is via USB. The ShockLog® PC software automatically finds an attached unit so there is no need to identify which USB port is used.

When conditions do not dictate a fixed water tight link a standard cable can be used. An IP67 watertight USB connector is available when conditions warrant its use. The supplied watertight cap should be refitted after communications are complete. Should the cap be left off, the unit remains water tight but the exposed connections may become tarnished which may lead to poor communications.

For a quick and simple way of setting up, starting or stopping a unit in the field, an iButton interface is available. The iButton interface also supports the download of a 'one-page report' giving a condensed view of the journey data gathered.

## Security

The ShockLog<sup>®</sup> 248 stores all data and status information in high performance FLASH memory. This memory requires no power to retain data. The instrument is configured by connecting to a PC and running the data analysis / setup software.

During the configuration process the operator has the option of setting passwords in order to limit subsequent access to data.

If passwords have been enabled to restrict access to data, reset the unit or other functions, the user must supply those passwords before the software will communicate with the ShockLog<sup>®</sup>.

An area of the flash memory is reserved for the security log – this memory records the timing of such actions as resetting the clock or clearing out data and cannot be modified by the operator. It is intended that the security log last the operating life of the instrument and will only be cleared when the ShockLog<sup>®</sup> is recalibrated at the factory.

## Software

The ShockLog<sup>®</sup> 248 software runs on a desktop or laptop PC using the Windows XP, Vista, Windows 7, or Windows 8 operating systems.

The software allows the operator to configure the ShockLog<sup>®</sup> 248 and to extract and examine data records from the instrument.

Reports may be viewed onscreen and selected data exported to other applications. Six different reports are available: download, summary, events summary, event details, time slot, and log data.

### Download:

This report presents a top-level view of a mission, providing the user with a single-page report that can be printed or copied into another document. It contains a Time Slots graph, an Event Summary graph, and the most severe event as well as configuration information. The report start and end time can be adjusted to focus on any part of the mission.

### Summary Report:

Data gathered at regular intervals is condensed into summary records. The period over which data is summarized can be set between 10 minutes and 24 hours according to the demands of the application. The summary records can be used to give an overview of a long period of data logging in a conventional spreadsheet format. A maximum of 512 summaries can be recorded in any one mission. The typical summary report parameters are date, time, number of warnings, number of alarms, max peak x, y, and z, max/min temperature, and range.

### Events Summary Report:

All the events are presented in a graphical or spreadsheet form. For each event the following parameters are available: date, time, range, temperature, max/min x/y/z, modulus. In addition the maximum modulus of all the events may be displayed graphically.

### **Event Details Report:**

Detailed information for all of the recorded events is available in spreadsheet or graphical form. When the graphical form is used pan and zoom controls are available. The following parameters are available: sample time, sample number, max/min x, y, and z

### **Time Slot Report:**

Data recorded in the time slot memory can be displayed in graphical form. The following parameters can be available depending on setup and unit specification: date, time, max peak x, y, and z, min peak x, y, and z, internal temperature, humidity, and external temperature.

### **Security Log Report:**

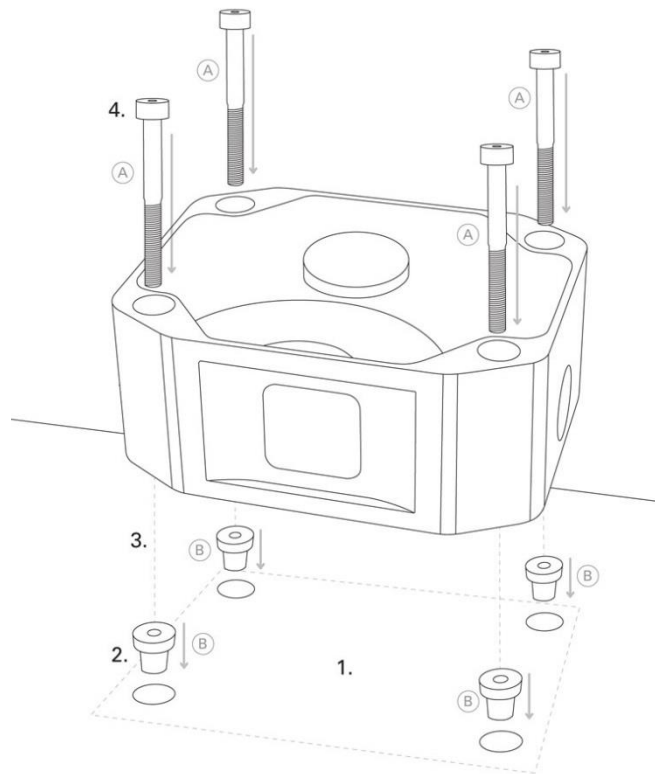
The security log data can be displayed in spreadsheet form. The following parameters are available: date and time of data clearing operations or resets.



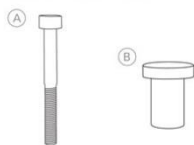
## Best Practices for Mounting

Mount the ShockLog® close to the most sensitive part of the product being monitored. The ShockLog® should be mounted to a solid, rigid surface and as low as possible. When monitoring long shipments (>20 feet / 6 meters), it is best to mount a ShockLog® at both ends of the shipment.

For best results, it is recommended that the unit be mounted directly to the product being monitored using all four mounting bolts included with the ShockLog®, as shown in the figure below.



### Kit contains:



(B) 4 x M5x45 bolts

(C) 4 x black rubber anti-vibration isolation bushings

### You will need:

- Electric drill with drill bit between 10.2mm and 10.3mm in diameter
- 5mm allen key

### Instructions:

1. Drill 4 (four) Ø10.2mm-10.3mm holes in your product to a depth of at least 17mm. Alternatively a mounting plate with the four holes could be mounted to your product.
2. Insert the 4 isolation bushings in the 4 holes, narrow end first.
3. With the ShockLog facing up align bolts with anti-vibration bushings.
4. Push M5 bolts through the holes from front to back. Tighten bolts clockwise with the allen key. Begin with 2 bolts diagonally opposite each other for optimal grip.



## ShockLog<sup>®</sup> 248 Technical Data

If it is not possible to mount the ShockLog<sup>®</sup> with mounting bolts, it is possible to use an aggressive adhesive or double-sided tape; however, it is important to remember that the ShockLog<sup>®</sup> should not be free to move inside the shipment.

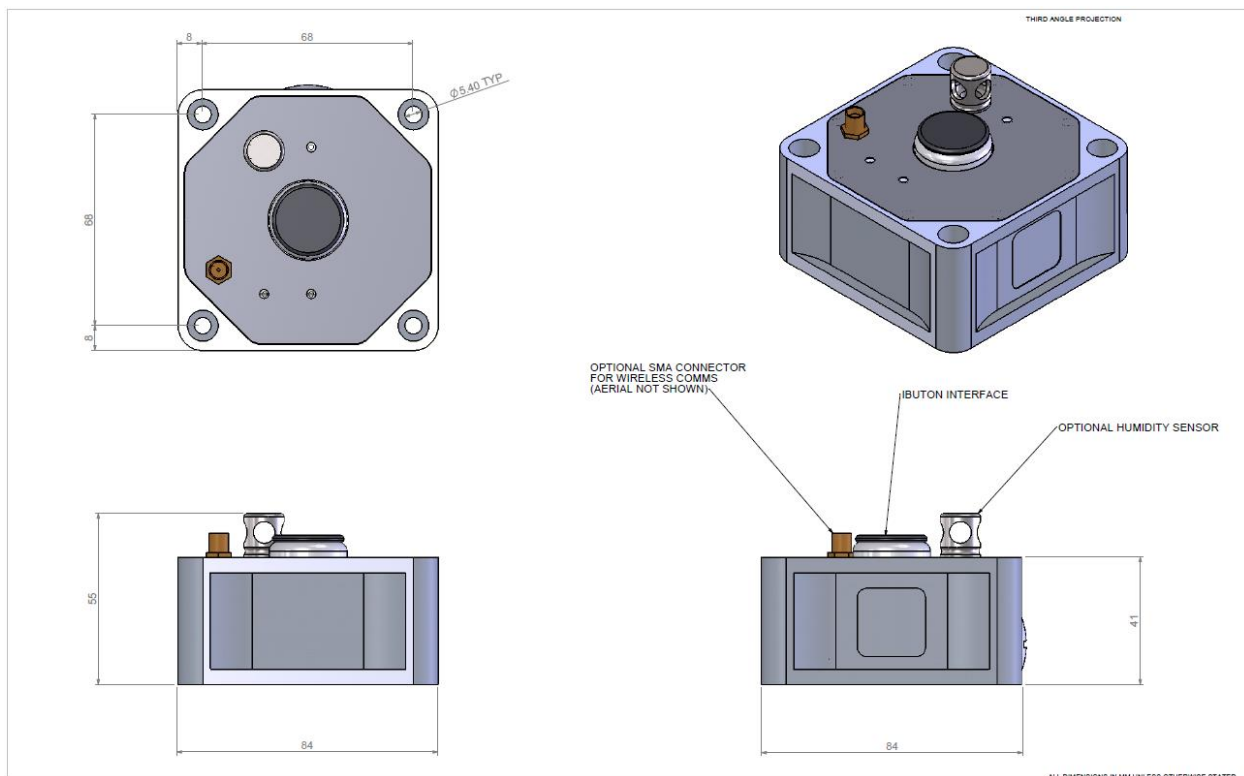
Additionally, a magnetic mounting plate is available that have been predrilled for the four rubber bushings provided in the mounting kit. See the Drawings section for plate dimensions.

Avoid building special brackets to mount the ShockLog<sup>®</sup>. If a cover is required over the product being monitored, place the cover over the ShockLog<sup>®</sup>, but do not attach the unit to the cover.

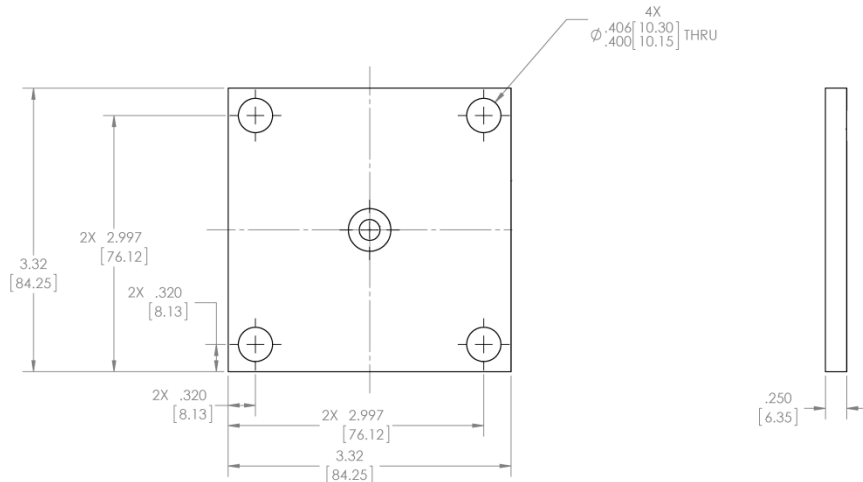
The ShockLog assumes the axes indicated on the unit. Mount the ShockLog<sup>®</sup> either vertically or horizontally and note the orientation to assist with data analysis.

### Drawings

#### ShockLog<sup>®</sup> 248



## Magnetic Mounting Plate



Note: Dimensions in inches

## Accessories & Related Products

Batteries, a mounting kit and a companion label are included with each ShockLog® 248. New users of the ShockLog® 248 will be required to purchase a kit in order to get all the necessary accessories and software licenses to correctly operate the device. The kit contains the following items (CD containing software and manual; Quick Start User Manual; USB Communication Cable; iButton Set: start, stop, download, setup, and clock iButtons; USB Connection BUS and Cable; and 2 AA Lithium Batteries). Additional software licenses, iButtons, and cables can be ordered separately.

The optional Humidity/Temperature Sensor (built-in) can be ordered to extend the conditions monitored by the ShockLog®.

## Declaration of Conformity

This ShockLog® product is in compliance with the essential requirements and other relevant provisions of directives, ESTI EN 301 489, EN 61326, FCC Rules CFR47 Parts 15 and RTCA/DO160D. Copies of these Declarations of Conformity are available upon request.

## Ordering Information

ShockLog® 248 units include batteries, mounting kit and companion label.

Part Number	Description
SL248-10-A	ShockLog® 248 Unit, 10G 40Hz
SL248-30-A	ShockLog® 248 Unit, 30G 90Hz
SL248-100-A	ShockLog® 248 Unit, 100G 250Hz
SL248-10H-A	ShockLog® 248 Unit, 10G 40Hz w/ External Humidity and Temperature Sensor
SL248-30H-A	ShockLog® 248 Unit, 30G 90Hz w/ External Humidity and Temperature Sensor
SL248-100H-A	ShockLog® 248 Unit, 100G 250Hz w/ External Humidity and Temperature Sensor
SL KIT 298-248-A	ShockLog® 298/248 Accessory Kit

## Technical Support

If you are unsure of how to use or interpret the ShockLog® 248, please contact ShockWatch Technical Support at (800) 527-9497 or (214) 736-4580.

## Warranty

If a product fails to conform to the specifications stated in this document, the product may be returned to ShockWatch at any time prior to the product's specified expiration date or, if no expiration date is specified, within one year from the date of shipment. ShockWatch shall either refund the purchase price (without interest), or repair and/or replace the product (or, in the case of services, re-perform such services) at no additional cost. The warranty is void if the defect has resulted from accident, misuse, abuse or misapplication. Any product which is identified as defective during the warranty period and is returned to ShockWatch with a Return Material Authorization (RMA) number (which must be obtained from ShockWatch prior to any return) within thirty (30) days after discovery of the defect with a written description of the defect will be replaced by ShockWatch.

## Limitation of Liability

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